

Distributed, Passivity-Based, Aeroservoelastic Control (DPASC) of Structurally Efficient Aircraft in the Presence of Gusts, Phase II

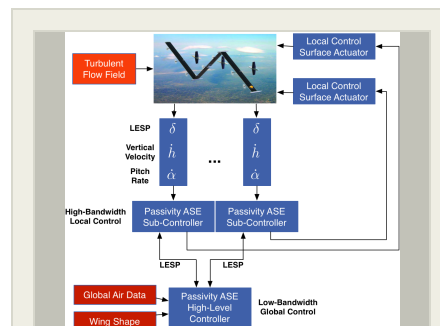
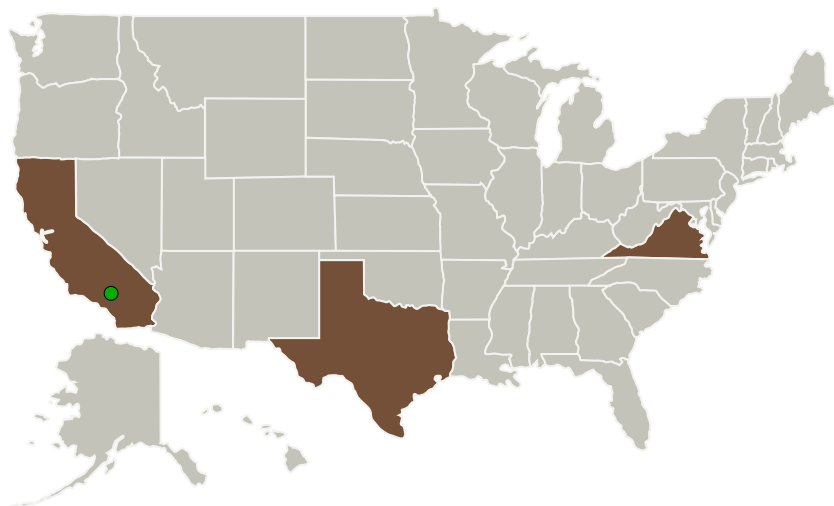
Completed Technology Project (2015 - 2017)



Project Introduction

Control of extremely lightweight, long endurance aircraft poses a challenging aeroservoelastic (ASE) problem due to significantly increased flexibility, and aerodynamic, structural, and actuator nonlinearities. To obtain the benefits of increased aerostructural efficiency, the controller needs to trim at a specified optimal shape while minimizing structural fatigue from gust disturbances. Tao Systems, Texas A&M University and University of Minnesota propose to develop a distributed, passivity-based, ASE controller (DPASC) using sectional aerodynamic and structural output-only feedback. This scalable approach has the potential to minimize the impact of aerodynamic / structural uncertainties and control surface free-play / saturation, while guaranteeing global asymptotic stability.

Primary U.S. Work Locations and Key Partners



Distributed, Passivity-Based, Aeroservoelastic Control (DPASC) of Structurally Efficient Aircraft in the Presence of Gusts, Phase II Briefing Chart Image

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Organizations Performing Work	Role	Type	Location
Tao of Systems Integration, Inc.	Lead Organization	Industry Minority-Owned Business, Small Disadvantaged Business (SDB)	Hampton, Virginia
● Armstrong Flight Research Center(AFRC)	Supporting Organization	NASA Center	Edwards, California
Texas A&M Engineering Experiment Station(TEES)	Supporting Organization	Academia	College Station, Texas

Primary U.S. Work Locations

California	Texas
Virginia	

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Tao of Systems Integration, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Arun Mangalam

Co-Investigator:

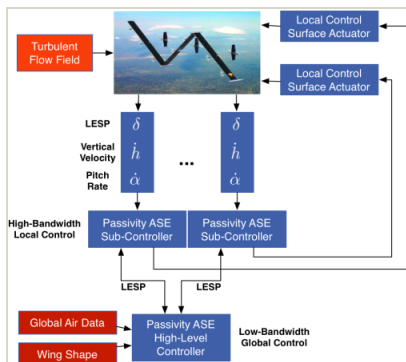
Arun Mangalam

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Images



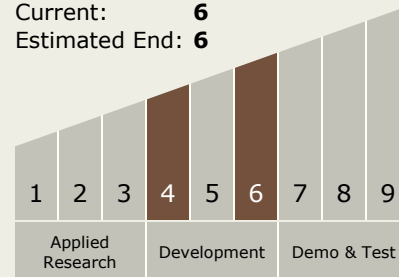
Briefing Chart Image

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Briefing Chart Image
(<https://techport.nasa.gov/image/129011>)

Technology Maturity (TRL)

Start: 4
Current: 6
Estimated End: 6



Technology Areas

Primary:

- TX15 Flight Vehicle Systems
 - TX15.1 Aerosciences
 - TX15.1.3 Aeroelasticity

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System